WHAT IS CLAIMED IS:

1. A method of decoding a communications signal representing symbols encoded according to respective portions of a spreading sequence, the method comprising:

generating time-offset correlations of the communications signal with the spreading sequence;

combining the time-offset correlations to generate first estimates for the symbols;

determining intersymbol interference factors that include a relationship among different portions of the spreading sequence; and

generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors.

2. A method according to Claim 1, wherein an intersymbol interference factors include a relationship between a first portion of the spreading sequence associated with the one symbol to a second portion of the spreading sequence associated with another symbol.

3. A method according to Claim 1, wherein generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors comprises generating the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

4. A method according to Claim 1, wherein determining intersymbol interference factors comprises determining the intersymbol interference factors from the spreading sequence and a channel estimate for a channel over which the communications signal is communicated.

5. A method according to Claim 4, further comprising generating the channel estimate from a communications signal.

6. A method according to Claim 4, wherein determining the intersymbol interference factors from the spreading sequence and a channel estimate comprises determining an intersymbol interference factor from the channel estimate and a cross correlation of portions of the spreading sequence.

7. A method according to Claim 4:

wherein the channel estimate comprises a channel impulse response and a chip pulse shape function; and

wherein determining the intersymbol interference factors from the spreading sequence and a channel estimate comprises determining the intersymbol interference factors from the channel impulse response, the chip pulse shape function, and the spreading sequence.

8. A method according to Claim 4:

where the channel estimate comprises a plurality of correlation times, an associated plurality of channel coefficients and a chip pulse shape function;

wherein generating time-offset correlations comprises correlating the communications signal with the spreading sequence at the plurality of correlation times to produce a plurality of time-offset correlations;

wherein combining the time-offset correlations is preceded by determining a plurality of weighting factors from the plurality of channel coefficients;

wherein combining the time-offset correlations comprises combining the plurality of time-offset correlations according to the determined plurality of weighting factors to generate one of the first estimates; and

wherein determining the intersymbol interference factors from the spreading sequence and a channel estimate comprises determining an intersymbol interference factor from the plurality of correlation times, the plurality of channel coefficients, the

chip pulse shape function, the determined plurality of weighting factors and the spreading sequence.

9. A method according to Claim 8, wherein determining a plurality of weighting factors from the plurality of channel coefficients comprises determining the plurality of weighting factors from the plurality of channel coefficients and knowledge of an interfering component of the communications signal.

10. A method according to Claim 9, wherein determining the plurality of weighting factors from the plurality of channel coefficients and knowledge of an interfering component of the communications signal comprises determining the plurality of weighting factors from the plurality of channel coefficients and a noise correlation estimate.

11. A method according to Claim 4, wherein generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors comprises generating the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

12. A method according to Claim 1, wherein the first estimates comprise decision statistics and wherein the second estimate comprises a sequence estimate.

13. A method according to Claim 1, wherein generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors comprises:

determining a number of states from an estimate of a channel over which the communications signal is communicated and a spreading factor and symbol modulation applied in generating the communications signal; and

generating the second estimate using a sequence estimation procedure over the determined number of states.

14. A method according to Claim 13, further comprising the step of generating the channel estimate from a communications signal.

15. A method according to Claim 13, wherein the determined number of states is constrained to a finite set of values.

16. A method according to Claim 1, wherein generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors comprises:

selecting, based on an estimate of a channel over which the communications signal is communicated and a spreading factor applied in generating the communications signal, a number of states from a group consisting of one and the order of a modulation constellation applied to the communications signal raised to a power greater than zero; and

generating the second estimate from the first estimates using a sequence estimation procedure over the determined number of states.

17. A method according to Claim 1, wherein generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors comprises generating the second estimate from the first estimates using a sequence estimation procedure selected from a group comprising a maximum likelihood sequence estimation (MLSE) procedure, a decision feedback sequence estimation (DFSE) procedure, a decision feedback equalization (DFE) procedure, and a reduced state sequence estimation (RSSE) procedure.

18. A method according to Claim 17, wherein generating the second estimate from the first estimates using a sequence estimation procedure selected from

a group comprising a maximum likelihood sequence estimation (MLSE) procedure, a decision feedback sequence estimation (DFSE) procedure, a decision feedback equalization (DFE) procedure, and a reduced state sequence estimation (RSSE) procedure comprises selecting the selected sequence estimation procedure based on an estimate of a channel over which the communications signal is communicated and a spreading factor applied in generating the communications signal.

19. A method according to Claim 1:

wherein generating time-offset correlations of the communications signal with the spreading sequence comprises generating multiple pluralities of time-offset correlations of the communications signal with the spreading sequence;

wherein combining the plurality of time-offset correlations to generate first estimates for the symbols comprises combining respective ones of the multiple pluralities of time-offset correlations to generate respective ones of the first estimates;

wherein determining intersymbol interference factors that include a relationship among different portions of the spreading sequence comprises generating a plurality of weighting factors that include a relationship among different portions of the spreading sequence; and

wherein generating a second estimate for the symbol from the first estimates based on the determined intersymbol interference factors comprises combining the first estimates according to the determined weighting factors to generate the second estimate.

20. A method of decoding a communications signal representing symbols encoded according to respective portions of a spreading sequence, the method comprising:

generating a plurality of time-offset correlations of the communications signal with the spreading sequence;

combining the plurality of time-offset correlations to generate a first estimate for one of the symbols of the sequence of symbols;

determining an intersymbol interference factor that includes a relationship among different portions of the spreading sequence; and

generating a second estimate for the one symbol from the first estimate based on the determined intersymbol interference factor.

21. A method according to Claim 20, wherein the intersymbol interference factor includes a relationship between a first portion of the spreading sequence associated with the one symbol to a second portion of the spreading sequence associated with another symbol.

22. A method according to Claim 20, wherein generating a second estimate for the one symbol from the first estimate based on the determined intersymbol interference factor comprises generating the second estimate from the first estimate using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factor.

23. A method according to Claim 20, wherein determining an intersymbol interference factor comprises determining the intersymbol interference factor from the spreading sequence and a channel estimate for a channel over which the communications signal is communicated.

24. A method according to Claim 23, wherein determining the intersymbol interference factor from the spreading sequence and a channel estimate comprises determining the intersymbol interference factor from the channel estimate and a cross correlation of portions of the spreading sequence.

25. A method of decoding a communications signal representing symbols encoded according to a spreading sequence, the method comprising:

generating time-offset correlations of the communications signal with the spreading sequence;

determining weighting factors from a channel estimate for a channel over which the communications signal is communicated and knowledge of an interfering component of the communications signal;

combining the time-offset correlations according to the determined weighting factors to generate first estimates for a symbol;

determining an intersymbol interference factor from the spreading sequence; and

generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors.

26. A method according to Claim 25, wherein generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors comprises generating the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factor.

27. A method according to Claim 25, wherein the symbols comprise a sequence of symbols having a symbol period, and wherein the spreading sequence has a period that is greater than the symbol period.

28. A method according to Claim 27, wherein an intersymbol interference factor includes a relationship among different portions of the spreading sequence.

29. A method according to Claim 28, wherein determining an intersymbol interference factor that includes a relationship among different portions of the spreading sequence comprises determining an intersymbol interference factor from a channel estimate for a channel over which the communications signal is communicated and a cross-correlation of portions of the spreading sequence.

30. A method according to Claim 27:

where the channel estimate comprises a plurality of correlation times, an associated plurality of channel coefficients and a chip pulse shape function;

wherein generating time-offset correlations comprises correlating the communications signal with the spreading sequence at the plurality of correlation times to produce a plurality of time-offset correlations;

wherein determining a plurality of weighting factors from a channel estimate for a channel over which the communications signal is communicated and knowledge of an interfering component of the communications signal comprises determining the plurality of weighting factors from the plurality of channel coefficients and from knowledge of an interfering spread spectrum signal; and

wherein determining an intersymbol interference factor from the spreading sequence comprises determining an intersymbol interference factor from the plurality of correlation times, the plurality of channel coefficients, the chip pulse shape function, the determined plurality of weighting factors and the spreading sequence.

31. A method according to Claim 27, wherein generating a second estimate for one of the symbols from the first estimate based on the determined intersymbol interference factors comprises generating the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

32. An apparatus for decoding a communications signal representing symbols encoded according to respective portions of a spreading sequence, the apparatus comprising:

a correlator circuit operative to generate time-offset correlations of the communications signal with the spreading sequence;

a combiner circuit operative to combine the time-offset correlations to generate first estimates for the symbols;

an intersymbol interference factor determiner circuit operative to determine intersymbol interference factors that include a relationship among different portions of the spreading sequence; and

an estimator circuit that generates a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors.

33. An apparatus according to Claim 32, wherein the intersymbol interference factors include a relationship between a first portion of the spreading sequence associated with the one symbol to a second portion of the spreading sequence associated with another symbol.

34. An apparatus according to Claim 32, wherein the estimator circuit comprises a sequence estimator circuit that generates the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

35. An apparatus according to Claim 32, wherein the intersymbol interference factor determiner circuit is operative to determine the intersymbol interference factors from the spreading sequence and a channel estimate for a channel over which the communications signal is communicated.

36. An apparatus according to Claim 35, further comprising a channel estimator circuit that generates the channel estimate from a communications signal.

37. An apparatus according to Claim 35, wherein intersymbol interference factor determiner circuit is operative to determine the intersymbol interference factors from the channel estimate and a cross correlation of portions of the spreading sequence.

38. An apparatus according to Claim 35:

wherein the channel estimate comprises a channel impulse response and a chip pulse shape function; and

wherein the intersymbol interference factor determiner circuit is operative to determine the intersymbol interference factors from the channel impulse response, the chip pulse shape function, and the spreading sequence.

39. An apparatus according to Claim 35:

where the channel estimate comprises a plurality of correlation times, an associated plurality of channel coefficients and a chip pulse shape function;

wherein the correlator circuit is operative to correlate the communications signal with the spreading sequence at the plurality of correlation times to produce a plurality of time-offset correlations;

wherein the apparatus further comprises a weighting factor determiner circuit that determines a plurality of weighting factors from the plurality of channel coefficients;

wherein the combiner circuit is operative to combine the plurality of time-offset correlations according to the determined plurality of weighting factors to generate one of the first estimates; and

wherein the intersymbol interference factor determiner circuit is operative to determine one of the intersymbol interference factors from the plurality of correlation times, the plurality of channel coefficients, the chip pulse shape function, the determined plurality of weighting factors and the spreading sequence.

40. An apparatus according to Claim 39, wherein the weighting factor determiner circuit is operative to determine the plurality of weighting factors from the plurality of channel coefficients and knowledge of an interfering component of the communications signal.

41. An apparatus according to Claim 35, wherein the weighting factor determiner circuit is operative to determine the plurality of weighting factors from the plurality of channel coefficients and a noise correlation estimate.

42. An apparatus according to Claim 35, wherein the estimator circuit comprises a sequence estimator that generates the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

43. An apparatus according to Claim 32, wherein the first estimates comprise decision statistics and wherein the second estimate comprises a sequence estimate.

44. An apparatus according to Claim 32, wherein the estimator circuit is operative to determine a number of states from an estimate of a channel over which the communications signal is communicated and a spreading factor and symbol modulation applied in generating the communications signal and to generate the second estimate using a sequence estimation procedure over the determined number of states.

45. An apparatus according to Claim 44, wherein the determined number of states is constrained to a finite set of values.

46. An apparatus according to Claim 32, wherein the estimator circuit is operative to select, based on an estimate of a channel over which the communications signal is communicated and a spreading factor applied in generating the communications signal, a number of states from a group consisting of one and the order of a modulation constellation applied to the communications signal raised to a power greater than zero and to generate the second estimate from the first estimates using a sequence estimation procedure over the determined number of states.

47. An apparatus according to Claim 32, wherein the estimator circuit is operative to generate the second estimate from the first estimates using a sequence estimation procedure selected from a group comprising a maximum likelihood sequence estimation (MLSE) procedure, a decision feedback sequence estimation (DFSE) procedure, a decision feedback equalization (DFE) procedure, and a reduced state sequence estimation (RSSE) procedure.

48. An apparatus according to Claim 47, wherein the estimator circuit is operative to select the selected sequence estimation procedure based on an estimate of a channel over which the communications signal is communicated and a spreading factor applied in generating the communications signal.

49. An apparatus according to Claim 32:

wherein the correlator circuit is operative to generate multiple pluralities of time-offset correlations of the communications signal with the spreading sequence;

wherein the combiner circuit comprises a first combiner circuit operative to combine respective ones of the multiple pluralities of time-offset correlations to generate respective ones of the first estimates;

wherein the intersymbol interference factor determiner circuit is operative to generate a plurality of weighting factors that include a relationship among different portions of the spreading sequence; and

wherein the estimator circuit comprises:

a memory circuit that stores the first estimates; and

a second combiner circuit that combines the stored first estimates according to the determined weighting factors to generate the second estimate.

50. An apparatus for decoding a communications signal representing symbols encoded according to respective portions of a spreading sequence, the apparatus comprising:

a correlator circuit operative to generate a plurality of time-offset correlations of the communications signal with the spreading sequence;

a combiner circuit operative to combine the plurality of time-offset correlations to generate a first estimate for one of the symbols of the sequence of symbols;

an intersymbol interference factor determiner circuit operative to determine an intersymbol interference factor that includes a relationship among different portions of the spreading sequence; and

an estimator circuit operative to generate a second estimate for the one symbol from the first estimate based on the determined intersymbol interference factor.

51. An apparatus according to Claim 50, wherein the intersymbol interference factor includes a relationship between a first portion of the spreading sequence associated with the one symbol to a second portion of the spreading sequence associated with another symbol.

52. An apparatus according to Claim 50, wherein the estimator circuit is operative to generate the second estimate from the first estimate using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factor.

53. An apparatus according to Claim 50, wherein the intersymbol interference factor determiner circuit is operative to determine the intersymbol interference factor from the spreading sequence and a channel estimate for a channel over which the communications signal is communicated.

54. An apparatus according to Claim 53, the intersymbol interference factor determiner circuit is operative to determine the intersymbol interference factor from the channel estimate and a cross correlation of portions of the spreading sequence.

55. An apparatus for decoding a communications signal representing symbols encoded according to a spreading sequence, the apparatus comprising:

a correlator circuit operative to generate time-offset correlations of the communications signal with the spreading sequence;

a weighting factor determiner circuit operative to determine weighting factors from a channel estimate for a channel over which the communications signal is communicated and knowledge of an interfering component of the communications signal;

a combiner circuit operative to combine the time-offset correlations according to the determined weighting factors to generate first estimates for the symbols;

an intersymbol interference factor determiner circuit that determines intersymbol interference factors from the spreading sequence; and

an estimator circuit that generates a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors.

56. An apparatus according to Claim 55, wherein the estimator circuit comprises a sequence estimator circuit that generates the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

57. An apparatus according to Claim 55, wherein the symbols comprises a sequence of symbols having a symbol period, and wherein the spreading sequence has a period that is greater than the symbol period.

58. An apparatus according to Claim 57, wherein an intersymbol interference factor includes a relationship among different portions of the spreading sequence.

59. An apparatus according to Claim 57, wherein the intersymbol interference factor determiner circuit is operative to determine an intersymbol interference factor from a channel estimate for a channel over which the communications signal is communicated and a cross-correlation of portions of the spreading sequence.

60. An apparatus according to Claim 57:

wherein the channel estimate comprises a plurality of correlation times, an associated plurality of channel coefficients and a chip pulse shape function;

wherein the correlator circuit is operative to correlate the communications signal with the spreading sequence at the plurality of correlation times to produce the plurality of time-offset correlations;

wherein the weighting factor determiner circuit is operative to determine a plurality of weighting factors from the plurality of channel coefficients and from knowledge of an interfering spread spectrum signal; and

wherein the intersymbol interference factor determiner circuit is operative to determine an intersymbol interference factor from the plurality of correlation times, the plurality of channel coefficients, the chip pulse shape function, the determined plurality of weighting factors and the spreading sequence.

61. An apparatus according to Claim 57, wherein the estimator circuit comprises a sequence estimator circuit operative to generate the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

62. An apparatus for decoding a communications signal representing symbols encoded according to respective portions of a spreading sequence, the apparatus comprising:

means for generating time-offset correlations of the communications signal with the spreading sequence;

means for combining the time-offset correlations to generate first estimates for the symbols;

means for determining intersymbol interference factors that include a relationship among different portions of the spreading sequence; and

means for generating a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factor.

63. An apparatus according to Claim 62, wherein the intersymbol interference factors include a relationship between a first portion of the spreading sequence associated with the one symbol to a second portion of the spreading sequence associated with another symbol.

64. An apparatus according to Claim 62, wherein the means for generating a second estimate comprises means for generating the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

65. An apparatus according to Claim 62, wherein the means for determining intersymbol interference factors comprises means for determining the intersymbol interference factors from the spreading sequence and a channel estimate for a channel over which the communications signal is communicated.

66. An apparatus according to Claim 65:

where the channel estimate comprises a plurality of correlation times, an associated plurality of channel coefficients and a chip pulse shape function;

wherein the means for generating time-offset correlations comprises means for correlating the communications signal with the spreading sequence at a plurality of correlation times to produce a plurality of time-offset correlations;

wherein the apparatus further comprises means for determining a plurality of weighting factors from the plurality of channel coefficients;

wherein the means for combining the time-offset correlations comprises means for combining the plurality of time-offset correlations according to the determined plurality of weighting factors to generate one of the first estimates; and

wherein the means for determining the intersymbol interference factors from the spreading sequence and a channel estimate comprises means for determining an intersymbol interference factor from the plurality of correlation times, the plurality of channel coefficients, the chip pulse shape function, the determined plurality of weighting factors and the spreading sequence.

67. An apparatus according to Claim 62, wherein the means for generating a second estimate comprises:

means for determining a number of states from an estimate of a channel over which the communications signal is communicated and a spreading factor and symbol modulation applied in generating the communications signal; and

means for generating the second estimate using a sequence estimation procedure over the determined number of states.

68. An apparatus for decoding a communications signal representing symbols encoded according to a spreading sequence, the apparatus comprising:

means for generating time-offset correlations of the communications signal with the spreading sequence;

means for determining weighting factors from a channel estimate for a channel over which the communications signal is communicated and knowledge of an interfering component of the communications signal;

means for combining the time-offset correlations according to the determined weighting factors to generate first estimates for the symbols;

means for determining intersymbol interference factors from the spreading sequence; and

means for generating a second estimate for one of the symbols from the first estimate based on the determined intersymbol interference factors.

69. An apparatus according to Claim 68, wherein the means for generating a second estimate comprises means for generating the second estimate from the first estimates using a sequence estimation procedure that employs a branch metric that is a function of the determined intersymbol interference factors.

70. An apparatus according to Claim 68, wherein the symbols comprise a sequence of symbols having a symbol period, and wherein the spreading sequence has a period that is greater than the symbol period.

71. An apparatus according to Claim 70, wherein an intersymbol interference factor includes a relationship among different portions of the spreading sequence.

72. A receiver, comprising:

a processor circuit operative to receive a communications signal representing symbols encoded according to respective portions of a spreading sequence and to generate a baseband signal from the received communications signal;

a correlator circuit operative to generate time-offset correlations of the baseband signal with the spreading sequence;

a combiner circuit operative to combine the time-offset correlations to generate first estimates for the symbols;

a intersymbol interference factor determiner circuit operative to determine intersymbol interference factors that include a relationship among different portions of the spreading sequence; and

an estimator circuit operative to generate a second estimate for the symbol from the first estimates based on the determined intersymbol interference factors.

73. A receiver according to Claim 72, wherein the communications signal comprises a radio signal, and wherein the processor circuit comprises a radio

processor circuit operative to receive the radio signal and to generate the baseband signal therefrom.

74. A receiver, comprising:

a processor circuit operative to receive a communications signal representing symbols encoded according to a spreading sequence and to generate a baseband signal therefrom;

a correlator circuit operative to generate time-offset correlations of the baseband signal with the spreading sequence;

a weighting factor determiner circuit operative to determine weighting factors from a channel estimate for a channel over which the communications signal is communicated and knowledge of an interfering component of the communications signal;

a combiner circuit operative to combine the time-offset correlations according to the determined weighting factors to generate first estimates for the symbols;

an intersymbol interference factor determiner circuit operative to determine intersymbol interference factors from the spreading sequence; and

an estimator circuit operative to generate a second estimate for one of the symbols from the first estimates based on the determined intersymbol interference factors.

75. A receiver according to Claim 74, wherein the communications signal comprises a radio signal, and wherein the processor circuit comprises a radio processor circuit operative to receive the radio signal and to generate the baseband signal therefrom.